Critical Habitat Designation for 4 Vernal Pool Crustaceans and 11 Vernal Pool Plants

Federal Register Notice 71 FR 7118; February 10, 2006

On August 11, 2005, we designated 111 units as critical habitat for the 15 vernal pool species (70 FR 46924). Many of the critical habitat units for the 15 vernal pool species overlap. The critical habitat areas described below constitute our best assessment at this time of areas determined to be occupied at the time of listing, contain the primary constituent elements (PCEs) essential to the conservation of the vernal pool species that may require special management or protection, and those additional areas found to be essential to the conservation of the 4 vernal pool crustaceans and 11 vernal pool plants.

Table 1 identifies the approximate area designated as critical habitat for the vernal pool crustaceans and vernal pool plants by land ownership.

TABLE 1.—Approximate areas of final critical habitat for the vernal pool crustaceans and plants in California and Oregon.

Critical Habitat	Federal		State		Local/Private		Total	
Units	acres	hectares	acres	hectares	acres	hectares	acres	hectares
Conservancy Fairy Shrimp								
1A–E	0	0	0	0	4,347	1,759	4,347	1,759
2	0	0	0	0	0	0	0	0
3	0	0	0	0	4,414	1,786	4,414	1,786
4	0	0	0	0	0	0	0	0
5	0	0	0	0	746	302	746	302
6	0	0	0	0	86,078	34,834	86,078	34,834
7A–F	0	0	0	0	19,671	7,960	19,671	7,960
8	0	0	0	0	46,531	18,830	46,531	18,830
Species Total	0	0	0	0	161,786	65,473	161,786	65,473
Longhorn Fairy Shrimp								
1 A–B	0	0	0	0	791	320	791	320
2	0	0	0	0	3,165	1,281	3,165	1,281
3	0	0	0	0	9.601	3,886	9.601	3,886
Species Total	0	0	0	0	13,557	5,486	13,557	5,486
Vernal Pool Fairy Shrimp								
1A–G	0	0	0	0	2,130	862	2,130	862
2A–E	0	0	0	0	2,251	911	2,251	911
3A–C	0	0	0	0	2,301	931	2,301	931
4A–B	432	175	0	0	460	186	892	361
5	42	17	0	0	4,296	1,738	4,338	1,755
6	0	0	0	0	39,173	15,853	39,173	15,853
7A–F	0	0	0	0	6,747	16,672	8,393	3,397
8	0	0	0	0	12,677	5,130	12,677	5,130
9	0	0	0	0	433	175	433	175

10	0	0	0	0	0	0	0	0
11	0	0	0	0	1,324	536	1,324	536
12	0	0	0	0	2,580	1,044	2,580	1,044
13	0	0	0	0	2,450	992	2,450	992
14	0	0	0	0	37,093	15,011	37,093	15,011
15	0	0	0	0	0	0	0	0
16	0	0	0	0	12,577	5,090	12,577	5,090
17	0	0	0	0	655	265	655	265
18	0	0	0	0	14,181	5,739	14,181	5,739
19A–C	0	0	108	44	7,784	3,150	7,892	3,194
20	0	0	0	0	746	302	746	302
21A–C	17	7	42	17	48,592	19,660	48,641	19,684
22	8	3	0	0	69,131	27,977	69,139	27,980
23A–K	0	0	0	0	28,540	11,550	28,540	11,550
24A–B	0	0	0	0	28,950	11,716	28,950	11,716
25	161	65	0	0	2,295	929	2,456	994
26A–F	0	0	0	0	6,688	2,707	6,688	2,707
27A–D	0	0	0	0	15,456	6,258	15,456	6,258
28	0	0	0	0	118,915	48,123	118,915	48,123
29A–H	0	0	0	0	50,055	20,257	50,055	20,257
30	0	0	0	0	9,601	3,886	9,601	3,886
31	5,527	2,237	0	0	15,227	6,162	20,754	8,399
32	44,580	18,042	0	0	1,951	788	46,531	18,830
33	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
Species Total	54,240	21,951	150	61	174,395	47,064	228,785	92,586
Vernal Pool Tadpole Shrimp								
1	42	17	0	0	4,296	1,739	4,338	1,756
2	15,347	6,211	19	8	32,748	13,252	48,114	19,471
3	0	0	0	0	8,393	3,397	8,393	3,397
4	0	0	0	0	17,652	7,143	17,652	7,143
5	0	0	0	0	0	0	0	0
6	0	0	0	0	980	397	980	397
7	0	0	0	0	1,324	536	1,324	536
8	0	0	0	0	2,450	992	2,450	992
9	0	0	0	0	37,093	15,011	37,093	15,011
10	310	126	0	0	130	52	440	178
11	89	36	0	0	12,482	5,051	12,571	5,087
12	0	0	0	0	0	0	0	0
13	0	0	0	0	4,700	1,902	4,700	1,902
14	0	0	0	0	92	37	92	37
15	0	0	0	0	53,607	21,694	53,607	21,694
16	0	0	0	0	28,540	11,550	28,540	11,550
17	209	85	0	0	1,593	644	1,802	729
18	0	0	0	0	6,688	2,707	6,688	2,707
Species Total	15,997	6,475	19	8	24,324	60,103	212,769	86,103

Butte County Meadowfoam								
1	0	0	0	0	1,962	794	1,962	794
2	0	0	0	0	4,059	1,642	4,059	1,642
3	0	0	0	0	1,454	589	1,454	589
4	0	0	0	0	9,161	3,707	9,161	3,707
Species Total	0	0	0	0	16,636	6,732	16,636	6,732
Contra Costa Goldfields								
1	0	0	0	0	2,637	1,067	2,637	1,067
2	0	0	0	0	1,106	411	1,106	411
3	0	0	0	0	534	216	534	216
4 A–C	0	0	0	0	5,929	2,399	5,929	2,399
5 A–B	0	0	0	0	839	339	839	339
6	0	0	0	0	398	161	398	161
7	0	0	0	0	3,286	1,330	3,286	1,330
8	0	0	0	0	92	37	92	37
9	0	0	0	0	0	0	0	0
Species Total	0	0	0	0	14,730	5,961	14,730	5,961
Hoover's Spurge								
1	0	0	0	0	2,838	1,149	2,838	1,149
2	0	0	0	0	8	3	8	3
3	0	0	0	0	0	0	0	0
4	0	0	0	0	37,595	15,214	37,595	15,214
5A–C	0	0	41	17	35,092	14,201	35,133	14,218
6A–E	0	0	0	0	16,505	6,679	16,505	6,679
7 A–E	0	0	0	0	22,634	9,160	22,634	9,160
Species Total	0	0	41	17	114,672	46,406	114,713	46,423
Fleshy Owl's Clover								
1	0	0	0	0	2,442	980	1,051	2,598
2A–B	0	0	0	0	31,875	12,899	14,131	34,917
3 A–B	0	0	0	0	85,197	34,478	63,353	156,542
4A–C	0	0	0	0	38,041	15,395	33,071	81,717
5A–B	0	0	0	0	14,081	5,698	11,888	29,375
6 A–B	370	150	0	0	3,888	1,573	4,258	1,723
Species Total	370	150			175,503	71,023	175,873	71,173
Colusa Grass								
1	310	126	0	0	130	52	440	178
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4A–E	0	0	0	0	48,838	19,764	48,838	19,764
5A–E	0	0	42	17	35,091	14,201	35,133	14,218
6	0	0	0	0	54,119	21,901	54,119	21,901

7A–F	0	0	0	0	13,564	5,489	13,564	5,489
Species Total	310	126	42	17	151,741	61,407	152,093	61,550
Greene's Tuctoria								
1	0	0	0	0	1,703	689	1,703	689
2	0	0	0	0	2,838	1,149	2,838	1,149
3	0	0	0	0	8	3	8	3
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6A–E	0	0	0	0	50,808	20,561	50,808	20,561
7	0	0	0	0	86,636	35,060	86,636	35,060
8A–C	0	0	0	0	3,127	1,265	3,127	1,265
Species Total	0	0	0	0	145,118	58,727	145,118	58,727
Hairy Orcutt Grass								
1	0	0	0	0	2,087	845	2,087	845
2	0	0	0	0	8	3	8	3
3	0	0	0	0	0	0	0	0
4	17	7	42	17	48,582	19,660	48,641	19,684
5	0	0	0	0	1,839	744	1,839	744
6	0	0	0	0	27,033	10,940	27,033	10,940
Species Total	17	7	42	17	79,549	32,192	79,608	32,216
Sacramento Orcutt Grass								
1	0	0	0	0	26	11	26	11
2	0	0	0	0	1,161	470	1,161	470
3	0	0	0	0	32,086	12,985	32,086	12,985
Species Total	0	0	0	0	33,273	13,465	33,273	13,465
San Joaquin Valley Orcutt Grass								
1	8	3	0	0	54,116	21,900	54,124	21,903
2	0	0	0	0	32,008	12,953	32,008	12,953
3A–C	0	0	0	0	30,713	12,429	30,713	12,429
4	0	0	0	0	476	193	476	193
5 A–B	370	150	0	0	3,888	1,573	4,258	1,723
6 A–D	0	0	0	0	14,734	5,962	14,734	5,962
Species Total	378	153	0	0	135,934	55,011	136,312	55,164
Slender Orcutt Grass								
1 A–K	22,987	9,303	0	0	4,192	1,697	27,180	10,999
2 A–D	81	33	0	0	10,698	4,330	10,780	4,362
3A–B	15,384	6,211	0	0	32,767	13,260	48,114	19,471
4	0	0	0	0	2,838	1,149	2,838	1,149
5 A–B	0	0	0	0	4,141	1,676	4,141	1,676
6	0	0	0	0	1,161	470	1,161	470

Species Total	38,416	15,546	0	0	55,797	22,580	94,213	38,127
Solano Grass								
1	310	125	0	0	130	53	440	178
2	0	0	0	0	0	0	0	0
Species Total	310	125	0	0	130	53	440	178

We present brief descriptions of all units, and reasons why they meet the definition of critical habitat, for the 4 vernal pool crustaceans and 11 vernal pool plants below.

Conservancy Fairy Shrimp

Unit 1, Vina Plains Unit, Butte and Tehama Counties (4,347 ac (1,759 ha))

The five subunits of the Vina Plains Unit (1A–1E) run generally southeast from a stretch of Deer Creek east of the town of Tehama to a stretch of Rock Creek north of the city of Chico. The subunits are separated from each other by stretches of the north fork of Singer Creek, Rattlesnake Creek, Pine Creek, and an unnamed tributary of Rock Creek with an associated dirt road. All five subunits were occupied by Conservancy fairy shrimp at the time of listing, are still occupied, and contain the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 19 days in all but the driest years (PCE 2); swales and associated uplands to provide the pools with intermittently flowing surface water (PCE 1); detritus as a food source (PCE 3); and rocks and plant material that provide shelter (PCE 4). Unit 1 represents the northernmost extent of the known range of the Conservancy fairy shrimp. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 2: Colusa Unit, Glenn and Colusa Counties

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 3, Jepson Prairie Unit, Solano County, (4,414 ac (1,786 ha))

This unit is just south of Travis Air Force Base, extending along Rio Vista Road (CA 12) from about 6 to 11 mi (10 to 18 km) east of Interstate 80. It has supported Conservancy fairy shrimp at least since the time of listing. The unit contains the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 19 days in all but the driest years (PCE 2); swales and associated uplands to provide the pools intermittently flowing surface water (PCE 1); detritus as a food source (PCE 3); and rocks and plant material that provide shelter (PCE 4).

Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 4, Montezuma Unit, Solano County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 5, Northern San Joaquin Valley Unit, Stanislaus County (746 ac (302 ha))

This unit is located west of the city of Modesto and east of the confluence of the San Joaquin and Stanislaus Rivers. It has been occupied by Conservancy fairy shrimp at least since the time of listing, and provides the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 19 days in all but the driest years (PCE 2); swales and associated uplands to provide the pools intermittently flowing surface water (PCE 1); detritus as a food source (PCE 3); and rocks and plant material that provide shelter (PCE 4). This unit is over 43 mi (70 km) from the next nearest occupied site. Such geographic isolation increases the likelihood that the local population may be genetically unusual (Lesica and Allendorf 1995, Fugate 1998). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 6, Merced Unit, Merced and Mariposa counties (34,834 ha (86,078 ac))

This unit stretches both east and north of the city of Merced. It lies primarily in Merced County, but the eastern edge extends from 0.3 to 2.5 mi (0.5 to 4 km) into Mariposa County, running roughly parallel to the County line from just south of the Merced River down to Dutchman's Creek. The Merced Unit has been occupied by the species at least since the time of listing, and includes portions of the largest block of pristine, high density vernal pool grasslands remaining in California (Vollmar 1999). The unit contains the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 19 days in all but the driest years (PCE 2); swales and associated uplands to provide the pools intermittently flowing surface water (PCE 1); detritus as a food source (PCE 3); and rocks and plant material that provide shelter (PCE 4). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 7, Grassland Ecological Unit, Merced County (19,671 ac (7,960 ha))

The six subunits of this unit (7A through 7F) lie due east of the town of Gustine, beginning at the Salt Slough about 12 mi (19 km) north of the town of Los Banos, and running generally east to Deadman's Creek, just north of the eastern edge of the Merced National Wildlife Refuge. All subunits except 7E include at least some land from the Grasslands Wildlife Management Area, managed by the Service. Subunit 7A also includes a portion of the Great Valley Grasslands State Park. This unit contains the largest intact vernal pool habitat for Conservancy fairy shrimp in the San Joaquin Valley (Holland 1998). Conservancy fairy shrimp have been found in large numbers in the unit at least since the time of listing. The unit contains the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 19 days in all but the driest years (PCE 2); swales and associated uplands to provide the pools with intermittently flowing surface water (PCE 1); detritus as a foodsource (PCE 3); and rocks and plant material that provide shelter (PCE 4). Special management considerations within this unit include agricultural conversion, hydrological changes that could dry or inundate the vernal pools, chemical contamination from adjacent agriculture, and invasion by exotic plant species.

Unit 8, Ventura County Unit, Ventura, Santa Barbara, and Los Angeles counties (46,531 ac (18,830 ha))

The Ventura County unit consists of an area straddling the entire stretch of the Piru Creek, upstream of its confluence with Lockwood Creek. It is about 10 mi (16 km) southwest of the point where Ventura, Los Angeles and Kern counties all meet. The unit has been occupied by the Conservancy fairy shrimp since the time of listing, and is unique in several ways. It is by far the most southern of all known occurrences of the species, lying about 186 mi (300 km) from the nearest known occupied site (CNDDB 2005). It consists primarily of forested habitat rather than grassland, and it supports the species at higher elevations (~5,500 ft. (1,700 m)) than other known occupied sites. These unusual habitat characteristics increase the likelihood that the Conservancy fairy shrimp in the area have unusual genetic characteristics which could be important to the survival of the species (Lesica and Allendorf 1995, Fugate 1998). The unit contains the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 19 days in all but the driest years (PCE 2); swales and associated uplands to provide the pools with intermittently flowing surface water (PCE 1); detritus as a food source (PCE 3); and rocks and plant material that provide shelter (PCE 4). Special management considerations include activities such as road construction that may disrupt the supporting hydrological systems or water quality of vernal pools in the area.

Longhorn Fairy Shrimp

Unit 1, Altamont Hills Unit, Contra Costa and Alameda counties (791 ac (320 ha)).

This unit consists of two subunits (1A and 1B) located on either side of the Contra Costa - Alameda county line in the Altamont Hills northeast of the city of Livermore. Both subunits have been occupied by longhorn fairy shrimp at least since the time of listing (Eriksen and Belk 1999, EBRPD 2001, CNDDB 2005). The unit contains the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 23 days in all but the driest years (PCE 2); swales and associated uplands providing the pools with intermittently flowing surface water (PCE 1); detritus as a foodsource (PCE 3); and rocks and plant material that provide shelter (PCE 4). Vernal pools in the unit typically occur in sandstone rock outcroppings, and may be less than three feet (1 meter) across. This is a unique habitat for longhorn fairy shrimp, and helps to maintain a diversity of habitats for the species. Special management considerations in the unit include hydrological changes that could dry or inundate the vernal pools, and invasion by exotic aquatic plant species.

Unit 2, Grassland Ecological Unit, Madera, Merced and Stanislaus counties (3,165 ac (1,281 ha))

This unit is due east of the town of Gustine, beginning at the Salt Slough about 12 mi (19 km) north of the town of Los Banos and running generally southwest to the area of the San Joaquin River. It has been occupied by the species since at least the time of listing. The western portion of the unit lies on Great Valley Grasslands State Park, while the eastern half is in the Grasslands Wildlife Management Area, managed by the Service. This is the only location where longhorn fairy shrimp occur in the Central Valley of California. The unit contains the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 23 days in all but the driest years (PCE 2); swales and associated uplands providing the pools with intermittently flowing surface water (PCE 1); detritus as a foodsource (PCE 3); and rocks and plant material that provide shelter (PCE 4). Special management considerations for the area include hydrological changes that could dry or inundate the vernal pools, chemical contamination, and invasion by aquatic species.

Unit 3, Carrizo Plain Unit, San Luis Obispo County (9,601 ac (3,886 ha))

This unit is located in the Carrizo Plain, just northwest of Soda Lake. It is the most southerly of the three sites known to be occupied by this species, and has been occupied since the time of listing. The unit contains the following vernal pool and associated upland features essential to the conservation of the species: seasonally inundated vernal pools and depressions that hold water for at least 23 days in all but the driest years (PCE 2); swales and associated uplands providing the pools with intermittently flowing surface water (PCE 1); detritus as a food source (PCE 3); and rocks and plant material that provide shelter (PCE 4). Special management considerations include hydrologic disruptions or modifications which may disturb vernal pool habitats, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Vernal Pool Fairy Shrimp

Oregon

Unit 1, North Agate Desert Unit, Jackson County (2,130 ac (862 ha))

This unit consists of seven subunits (1A-1G) which are all located to the north of Little Butte Creek. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). The Oregon units occur approximately 125 miles (mi) (200 kilometer (km)) north of the nearest unit designated for this species in California and represents the species' geographic distribution and varying habitat types. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 2, White City East Unit, Jackson County (2,251 ac (911 ha))

This unit consists of five subunits (2A–2E) which are located east of U.S. Route 62 (Crater Lake Highway) and south and southeast of Dutton Road. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit provides the easternmost extent of the species' range in Oregon. The unit represents a significant component of the species' original range in the State and is of a sufficient size to sustain the natural ecosystem processes (e.g., fires) that have historically influenced vernal pool habitat (Borgias 2003). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 3, White City West Unit, Jackson County (2,301 ac (931 ha))

This unit consists of three subunits (3A–3C) and is located west of Agate Road, south of the Rogue River, and east of Bear Creek. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which

provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains the least fragmented intact examples of the original Agate Desert mounded vernal pool grassland habitat. It is of sufficient size to sustain the natural ecosystem processes (e.g., fires) that have historically influenced vernal pool habitat. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 4, Table Rocks Unit, Jackson County (892 ac (361 ha))

This unit consists of two subunits (4A–4B) and is located on two flat-topped mesas known as Upper and Lower Table Rocks, situated north and west of the Rogue River. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). Vernal pools on the Table Rocks differ from those of the Agate Desert, in that they are formed over an impervious layer of bedrock. This unit represents a unique habitat for vernal pool fairy shrimp in Oregon. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

California

Unit 5, Redding Unit, Shasta County (4,338 ac (1,755 ha))

This unit is located in the area east of the Redding Municipal Airport between Airport Road to the west and Deschutes Road to the east. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains the largest intact vernal pool habitat in the Sacramento Valley and represents the northern portion of vernal pool fairy shrimp's range in California. Occurrences of the species (CNDDB 2005) within vernal pools mapped by Holland (1998) are found on old alluvial terraces above the Sacramento River and often on Redding and Corning soil complexes (Shasta County 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational

vehicles, and control of invasive plant species.

Unit 6, Red Bluff Unit, Tehama County (39,173 ac (15,853 ha))

This unit extends from southwest of Red Bluff at Red Bank Creek south to Thomes Creek. The eastern boundary includes the vernal pool habitat from the Southern Pacific Railroad near Coyote Creek south paralleling Interstate 5 to Thomes Creek. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains vernal pools formed on alluvial terraces west of the Sacramento River and associated with Newville/Corning and Redding/Corning soil complexes (USDA 2001) exhibiting well-developed mima mound topography. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 7, Vina Plains Unit, Tehama and Butte Counties (8,393 ac (3,397 ha))

This unit is comprised of six subunits (7A-7F) and is located in the northeastern portion of the Sacramento Valley from Deer Creek in Tehama County to Chico in Butte County. The unit extends south and east of the Sacramento River paralleling the low elevation foothill region of the Sierra Nevada and represents the northeastern extent of vernal pool fairy shrimp's range in California. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). The vernal pools associated with this unit are Northern Volcanic Mudflow vernal pools. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 8, Orland Unit, Tehama and Glenn counties (12,677 ac (5,130 ha))

This unit extends from the Tehama/Glenn County border in the south, west of Ingrahm Road and east of the Black Butte Reservoir, to the vicinity of Rice Creek in the north. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a

matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains vernal pools formed on alluvial terraces of Northern Hardpan formations west of the Sacramento River and associated with Anita clay and Tuscan loam soils (USDA 1994). These vernal pools are generally small and exhibit well-developed mima mound topography. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 9, Oroville Unit, Butte County (433 ac (175 ha))

This unit is located south of State Route 149. Bruce Road bisects this unit. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). Vernal pool fairy shrimp within this unit live within pools occurring primarily on the Tuscan geologic formation (Liss 2001, Keeler-Wolf et al. 1998), which are some of the few remaining examples of Northern Volcanic Mudflow vernal pools described by Sawyer and Keeler-Wolf (1995). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 10, Sacramento National Wildlife Refuge Unit, Glenn and Colusa counties.

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 11, Beale Unit, Yuba County (1,324 ac (536 ha))

This unit is found east of Yuba City and State Highway 65, generally south of Hammonton Road and north of South Beale Road. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains large, relatively undisturbed unusually diverse vernal pool grassland habitat types supporting vernal pool fairy shrimp (Jones and Stokes 1997b; Platenkamp 1998; CNDDB 2001; Jones and Stokes 2002). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic

disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 12, Western Placer Unit, Placer County (2,580 ac (1,044 ha))

This unit is comprised of two subunits (12A-12B) and is near State Route 65 and Wise Road and west of Lincoln near Nelson and Nicolaus Roads. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). Vernal pool fairy shrimp within this unit occur in both Northern Hardpan and Northern Volcanic Mudflow vernal pools as described by Sawyer and Keeler-Wolf (1995). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 13, Mather Unit, Sacramento County (2,450 ac (992 ha))

This unit is located north of State Route 16, west of Sunrise Boulevard along Mather Boulevard. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit supports vernal pool fairy shrimp occurrences within a diversity of vernal pool habitats, including young or low terrace vernal pools on the Riverbank Formation, old or high terrace vernal pools on the Laguna and Arroyo Seco geologic formations, and Northern Volcanic Mudflow vernal pools on the Mehrten and Valley Springs geologic formations. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 14, Cosumnes Unit, Sacramento and Amador counties (37,093 ac (15,011 ha))

This unit consists of two subunits (14A–14B) located south of Deer Creek and the Cosumnes River to an area just south of the Sacramento and San Joaquin County. The eastern boundary is the low-elevation foothills of western Amador County. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the

species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit supports vernal pool fairy shrimp occurrences within a diversity of vernal pool habitats, including Northern Volcanic Mudflow vernal pools on the Mehrten and Valley Springs geologic formation overlain by Pardee and Pentz soils, vernal pools occurring on low terrace landforms associated with San Joaquin soils, and high terrace landforms associated with Redding and Corning soils (USDA 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 15, Vacaville Unit, Solano County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 16, Jepson Prairie Unit, Solano County (12,577 ac (5,090 ha))

This unit is comprised of four subunits (16A–16D) and is located in the southern portion of Solano County, southeast of Interstate 80 and the cities of Fairfield and Vacaville, north of Grizzly Bay and Montezuma Slough, west of the Sacramento River and the Solano and Sacramento county line, and south of Midway Road and the City of Dixon. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents vernal pool habitat that occur in large, playa-like pools which may be over several acres in size. The species can also be found in smaller pools and hogwallow depressions that also occur within this unit. The Jepson Prairie Unit supports vernal pool tadpole shrimp within unusual combinations of low terrace and basin rim landform vernal pools on a diversity of soil types, maintaining a diversity of habitats for vernal pool tadpole shrimp. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 17, Napa River Unit, Napa County (655 ac (265 ha))

This unit is situated south and southwest of the City of Napa, primarily west of State Route 29, south of State Route 12, and east of State Route 121. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the

species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents the western extent of the species' range and the only area where vernal pool fairy shrimp occur in vernal pool habitats forming a transition zone with tidal marshes. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 18, San Joaquin Unit, San Joaquin County (14,181 ac (5,739 ha))

This unit occupies the area from the Calaveras River south to Duck Creek. The eastern boundary extends to near Valley Springs at the intersection of State routes 12 and 26. The western boundary extends to near Tully Road east of the City of Lodi. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents Northern Volcanic Mudflow vernal pools on the Laguna geologic formation, as well as high terrace pools on the Valley Springs geologic formation. The Northern Volcanic Mudflow vernal pools tend to be short-lived, and are a relatively rare habitat type for vernal pool fairy shrimp. This unit contains the largest vernal pool complex remaining in San Joaquin County and the southern Sacramento Valley. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 19, Altamont Hills Unit, Contra Costa and Alameda counties (7,892 ac (3,194 ha))

This unit is comprised of three subunits (19A–19C) and is located in the general vicinity of Mount Diablo and Morgan Territory Regional Park. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). The unit represents the only known location that supports vernal pool fairy shrimp within sandstone outcrop pools (Eriksen and Belk 1999). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of

off-road recreational vehicles, and control of invasive plant species.

Unit 20, Caswell Unit, Stanislaus County (746 ac (302 ha))

This unit is situated west of the City of Modesto and east and southeast of the confluence of the San Joaquin and Stanislaus rivers. Caswell Memorial State Park lies just north of this unit. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit is over 75 km (47 mi) from the nearest unit to the north. Such isolated populations may have genetic characteristics essential to overall long-term conservation of the species (i.e. they may be genetically different than more central populations) (Fugate 1992, 1998). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 21, Stanislaus Unit, Stanislaus, Mariposa, and Merced Counties (48,641 ac (19,684 ha))

This unit is comprised of three subunits (21A–21C) and is located in the southeast corner of Stanislaus County and the northeast corner of Merced County. It lies between the Tuolumne River and the Merced River. The Mariposa County line is located east of the unit. Turlock Lake and Dawson Lake are adjacent to the northern boundary. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains occurrences of the species within large, relatively intact, and contiguous vernal pool complexes ranging from the floor of the valley to the low-elevation foothills (Holland 1998; CNDDB 2005). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 22, Merced Unit, Merced and Mariposa counties (69,139 ac (27,980 ha))

The Merced Unit is located midway in a chain of vernal pool complexes that straddles the valley floor and the foothills of the southern Sierra Nevada. Bear Creek flows along the southern boundary and Bear Reservoir is southeast of the unit. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species:

mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit encompasses the largest block of pristine, high density vernal pool grasslands supporting the species remaining in California(Holland 1998; Vollmar 1999; CNDDB 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 23, Merced Unit, Merced County (28,540 ac (11,550 ha))

The unit consists of 11 subunits (23A–23K) and lies north of the City of Los Banos, southwest of the City of Merced, and is bisected by the San Joaquin River. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents Northern Claypan vernal pools formed by a diversity of vernal pool soil types, including Delhi–Dello–Himar, Solano–Caypay–Willows, Rossi–Waukena, and Lewis–Landlow soils (Silveira 2000). Many of the vernal pools supporting vernal pool tadpole shrimp within this unit are large (over several acres in size), turbid, and alkaline. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 24A and B, Madera Unit, Madera and Fresno counties (28,950 ac (11,716 ha))

The unit consists of two subunits (24A–24B) and is located between the Fresno River and San Joaquin River. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents hardpan vernal pool complexes composed of numerous small pools and swales on mima mound topography (Holland 1998, Keeler-Wolf et al. 1998, CNDDB 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 25, Table Mountain Unit, Fresno County (2,456 ac (994 ha))

The unit is west of Marshall Station and North of Table Mountain Rancheria on Table Mountain. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains Northern Basalt Flow vernal pools found on narrow, sinuous basalt mesas above the surrounding low-lying terrain. Basalt flow vernal pools are a very rare habitat type for vernal pool tadpole shrimp, and the habitats within this unit are important for maintaining the range of ecological conditions in which the species occurs. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 26, Cross Creek Unit, Tulare and Kings Counties (6,688 ac (2,707 ha))

The unit contains three subunits (26A–26B) and is located in northwest Tulare County west of Seville. The Friant Kern Canal is north of the unit and the Cottonwood Creek Levee is south of the unit. Road 140 runs west of the unit. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This area represents the southern extent of vernal pool fairy shrimp range along the eastern margin of the Central Valley, and is the largest contiguous vernal pool habitat in this region (Holland 1998; CNDDB 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 27, Pixley Unit, Tulare County (15,465 ac (6,258 ha))

The unit contains four subunits (27A–27D) and is located south of the Cities of Hanford and Lemoore, north of the City of Wasco, and east of the City of the Tulare. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This area represents the southern

extent of vernal pool fairy shrimp range along the eastern margin of the Central Valley, and is the largest contiguous vernal pool habitat in this region (Holland 1998; CNDDB 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 28, San Benito County Unit, San Benito and Monterey Counties (118,915 (48,123 ha))

The unit is located in the southwestern portion of San Benito County and the easternmost portion of Monterey County. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit consists of a distinct collection of ephemerally flooded wetlands west of the Great Central Valley, and overlaps a portion of the Central Coast vernal pool region that has been delineated by CDFG (Keeler-Wolf et al. 1998). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 29A, B, and C, Central Coastal Ranges Unit, Monterey and San Luis Obispo Counties (50,055 ac (20,257 ha)).

The unit contains eight subunits (29A–29H) and is located in Monterey and San Luis Obispo Counties adjacent to the town of Lockwood, the towns of Bradley and San Miguel, and the City of Paso Robles. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This area represents one of four population centers in the Central Coast Range and represents the western extent of the species' range. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 30, Carrizo Plain Unit, San Luis Obispo County (9,601 ac (3,886 ha))

The unit encompasses California Valley and Soda Lake. State Highway 58 is located north of the unit. This unit was known to be occupied by vernal pool fairy shrimp at the time of

listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains Northern Claypan vernal pools (Sawyer and Keeler-Wolf 1995) in numerous shallow alkaline depressions within a Valley Saltbush Scrub matrix. This is the only area where vernal pool fairy shrimp are known from saline salt brush scrub vernal pool habitats. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 31, Lake Cachuma Area Unit, Santa Barbara County (20,754 ac (8,399 ha))

The Lake Cachuma critical habitat unit is located within a 10 mi (16 km) radius of the northwestern portion of Lake Cachuma in central Santa Barbara County. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains some of the last seasonally flooded aquatic habitats in Santa Barbara County. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 32, Ventura County Unit, Ventura County (46,531 ac (18,830 ha))

The Ventura County Unit is located in the north-central portion of Ventura County. Unit 32 for vernal pool fairy shrimp contains vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains ephemeral aquatic environments that are rarely associated with vernal pool fairy shrimp that occur at relatively high-elevation (5,500 ft (1,700 m)) forested sites. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Units 33, 34, and 35, Riverside County.

Units 33, 34, and 35 have been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Vernal Pool Tadpole Shrimp

Unit 1, Stillwater Plains Unit, Shasta County (4,338 ac (1,756 ha))

This unit is located in the area east of the Redding Municipal Airport between Airport Road to the west and Deschutes Road to the east. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents the northern extent of the species in California and tadpole shrimp within this unit are genetically different from other populations, particularly those in the foothills of the Sierra Nevada (King 1996). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 2, Dales Unit, Shasta and Tehama Counties (48,114 ac (19,471 ha))

This unit consists of two subunits (2A–2B) located in northern Tehama County west of Inskip Hill and the Sacramento River near Table Mountain. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit is one of the few areas where vernal pool tadpole shrimp are known to occur in Northern Mudflow vernal pools (CNDDB 2005) that are generally small and tend to be inundated for relatively short periods of time (Keeler-Wolf et al. 1998). These Northern Mudflow pools represent a unique habitat for the species. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimps' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 3, Vina Plains Unit, Tehama and Butte Counties (8,393 ac (3,397 ha))

This unit is located in the northeastern portion of the Sacramento Valley, from south of Deer Creek in Tehama County to Big Chico Creek north of Chico in Butte County. Unit 3 consists of six subunits (3A–3F) and was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of

upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents one of the few areas where vernal pool tadpole shrimp are known to occur in Northern Basalt Flow vernal pools. Northern Basalt Flow vernal pools are limited to ancient terraces and hilltops that comprise some of the oldest geologic formations in California. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 4, Oroville Unit, Butte County (17,652 ac (7,143 ha))

This unit consists of six subunits (4A–4F) located in the northeastern portion of the Sacramento Valley from near Chico south to the Yuba River in Yuba County. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains some of the few areas where vernal pool tadpole shrimp are found in Northern Volcanic Mudflow vernal pools, including vernal pools found on the Tuscan and Lovejoy Basalt geologic formations (CNDDB 2005; Keeler-Wolf et al. 1998). These Northern Mudflow pools represent a unique habitat for the species. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimps' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 5, Sacramento National Wildlife Refuge Unit, Glenn and Colusa counties.

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 6, Dolan Unit, Colusa County (980 ac (397 ha))

This unit is located east of Interstate 5, south of the City of Colusa, and west of the Colusa National Wildlife Refuge. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents vernal pool habitats on Northern Claypan vernal pools, as defined by Sawyer and Keeler-Wolf (1995). These vernal pools occur on alkaline soils and typically form alkali playas which are larger and contain a more diverse species composition than the hardpan pools further south (Keeler-Wolf et al. 1998). Special management

considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 7, Beale Unit, Yuba County (1,324 ac (536 ha))

This unit is located in southwestern Yuba County, south of the Yuba River and Yuba Goldfields, east of State Route 70, and north of the Bear River adjacent to Beale Air Force Base. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents vernal pool habitats on occurring on four major geologic formations: the Modesto Formation; the Riverbank Formation; the Laguna Formation; and the Mehrten Formation. Different geologic formations provide a diversity of habitats for vernal pool tadpole shrimp primarily through their effects on pool size and depth (Helm 1998; Platenkamp 1998). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 8, Mather Unit, Sacramento County (2,450 ac (992 ha))

This unit is located north of State Route 16, west of Sunrise Boulevard along Mather Boulevard. Unit 8 for vernal pool tadpole shrimp contains vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit supports vernal pool tadpole shrimp occurrences within a diversity of vernal pool habitats, including young or low terrace vernal pools on the Riverbank Formation, old or high terrace vernal pools on the Laguna and Arroyo Seco geologic formations, and Northern Volcanic Mudflow vernal pools on the Mehrten and Valley Springs geologic formations. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 9, Cosumnes Unit, Sacramento and Amador counties (37,093 ac (15,011 ha))

This unit consists of two subunits (9A–9B) and is located south of Deer Creek and the Cosumnes River to an area just south of the Sacramento and San Joaquin County. The eastern boundary is the low-elevation foothills of western Amador County. This unit was known to be

occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit supports vernal pool tadpole shrimp occurrences within a diversity of vernal pool habitats, including Northern Volcanic Mudflow vernal pools on the Mehrten and Valley Springs geologic formation overlain by Pardee and Pentz soils, vernal pools occurring on low terrace landforms associated with San Joaquin soils, and high terrace landforms associated with Redding and Corning soils (USDA 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 10, Davis Communications Annex Unit, Yolo County (440 ac (178 ha))

This unit is located southeast of the City of Davis and south of the South Fork of Putah Creek. This unit's western boundary coincides with the Solano and Yolo County line. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents some of the last remaining claypan vernal pools in Yolo County and west of the Sacramento River. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 11, Jepson Prairie Unit, Solano County (12,571 ac (5,087 ha))

This unit is comprised of four subunits (11A–11D) and is located in the southern portion of Solano County, southeast of Interstate 80 and the cities of Fairfield and Vacaville, north of Grizzly Bay and Montezuma Slough, west of the Sacramento River and the Solano and Sacramento county line, and south of Midway Road and the City of Dixon. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents vernal pool habitat that occur in large, playa-like pools which may be over several acres in size. The species can also be found in smaller pools and hogwallow depressions that also occur within this unit. The Jepson Prairie Unit supports vernal pool tadpole shrimp within unusual combinations of low

terrace and basin rim landform vernal pools on a diversity of soil types, maintaining a diversity of habitats for vernal pool tadpole shrimp. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 12, Suisun Marsh Area Unit, Solano County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 13, Stanislaus Unit, Stanislaus County (4,700 ac (1,902 ha))

This unit is comprised of three subunits (13A–13C) and is south of the Stanislaus River and north of Dry Creek to the south in western Stanislaus County. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents vernal pool habitat that contains hardpan pools on soils of alluvial fans and terraces. It is important ecologically for its numerous small pools and swales on mima mound topography, supported by soils that are typically older than those of the alluvial terraces in the Sacramento area. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 14, San Francisco Bay Unit, Alameda County (92 ac (37 ha))

This unit is comprised of two subunits (14A–14B) and is situated south of the cities of Fremont and Newark, west of Interstate 880 and north of Mud Slough. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents the only location where vernal pool tadpole shrimp occur in the San Francisco Bay region, and because it represents the western extent of the species range. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 15, Merced Unit, Merced, Madera, and Mariposa Counties (53,607 ac (21,694 ha))

This unit is located mostly south along State Route 140 east of Santa Fe Avenue. Le Grand and White Rock Road bisect this unit. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents portions of the largest block of pristine, high-density vernal pool grasslands remaining in California (Vollmar 1999). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 16, Grassland Ecological Unit, Merced County (28,540 ac (11,550 ha))

The unit consists of 11 subunits (16A-16K) and lies north of the City of Los Banos, southwest of the City of Merced, and is bisected by the San Joaquin River. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit represents Northern Claypan vernal pools formed by a diversity of vernal pool soil types, including Delhi–Dello–Himar, Solano–Caypay–Willows, Rossi–Waukena, and Lewis–Landlow soils (Silveira 2000). Many of the vernal pools supporting vernal pool tadpole shrimp within this unit are large (over several acres in size), turbid, and alkaline. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 17, Table Mountain Unit, Fresno County (1,802 ac (729 ha))

The unit is west of Marshall Station and North of Table Mountain Rancheria on Table Mountain. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains Northern Basalt Flow vernal pools found on narrow, sinuous basalt mesas

above the surrounding low-lying terrain. Basalt flow vernal pools are a very rare habitat type for vernal pool tadpole shrimp, and the habitats within this unit are important for maintaining the range of ecological conditions in which the species occurs. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Unit 18, Tulare Unit, Tulare and Kings counties (6,688 ac (2,707 ha))

The unit is comprised of six subunits (18A–18F) and is located in northwest Tulare County. This unit was known to be occupied by vernal pool tadpole shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). This unit contains pools formed on San Joaquin, Cometa, and Madera soils and represents the southern extent of the vernal pool tadpole shrimp's range. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate vernal pool tadpole shrimp distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive plant species.

Butte County Meadowfoam

Unit 1, Rock Creek Unit, Butte, and Tehama counties (1,962 ac (794 ha))

This unit is located north of the City of Chico, California, and includes vernal pools and vernal pool grassland habitat east of Highway 99 along the Sierra Nevada foothills from near Pine Creek southeast to Rock Creek. This unit was known to be occupied by Butte County meadowfoam at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit contains vernal pools on the Tuscan formation, which typically remain inundated for shorter periods of time than other types of vernal pools and represents the northern extent of Butte County meadowfoam's range, and includes occurrences from the northern race of Butte County meadowfoam. This race is genetically different from the southern race (Jokerst 1989, Dole and Sun 1992), and is important to maintain genetic diversity within the species. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Butte County meadowfoam's distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 2, Chico Unit, Butte County (4,058 ac (1,642 ha))

This unit is located northeast of the City of Chico, California, and includes vernal pools and vernal pool grassland habitat. The unit extends south from Rock Creek and the Chico Airport to near Big Chico Creek. Highway 99 is located west of this unit. This unit was known to be occupied by Butte County meadowfoam at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit contains vernal pools on the Tuscan-Anita soils and the Tuscan, Riverbank, Redbluff, and Modesto geologic formations (EPA 1994, Holland 1998, Liss 2001, CNDDB 2001), which typically remain inundated for shorter periods of time than other types of vernal pools and includes occurrences from the northern race of Butte County meadowfoam. This race is genetically different from the southern race (Jokerst 1989, Dole and Sun 1992), and is important to maintain genetic diversity within the species. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Butte County meadowfoam's distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 3, Doe Mill Unit, Butte County (1,454 ac (589 ha))

This unit is located east of the City of Chico, California, and includes vernal pools and vernal pool grassland habitat. The unit extends east along Stilson Canyon Road from approximately Bruce Road. This unit was known to be occupied by Butte County meadowfoam at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit contains vernal pools on the Tuscan geologic formation on Igo-Redding soils (EPA 1994, Holland 1998, Liss 2001, CNDDB 2001). Plants within this unit are of the southern race of Butte County meadowfoam (Jokerst 1989, Dole and Sun 1992) and comprise a significant portion of the species genetic diversity. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Butte County meadowfoam's distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 4, Oroville Unit, Butte County (9,161 ac (3,707 ha))

This unit occupies an area northwest of the City of Oroville. The unit is located south of Dry Creek near State Route 70 southeast to the Thermalito Diversion Pool. This unit was known to be occupied by Butte County meadowfoam at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit contains vernal pools on the Tuscan, Red Bluff and Riverbank geologic formations where the species is found (EPA 1994, Holland 1998, Liss 2001, CNDDB 2001). This unit contains individuals from the southern race of Butte County meadowfoam and represents an important component of the species genetic diversity. This unit also represents the southern extent of Butte County meadowfoam's range. The Shipee Site has been described as the type locality for the species and is located within this unit. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Butte County meadowfoam's distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Contra Costa Goldfields

Unit 1, Manchester Unit, Mendocino County (2,637 ac (1,067 ha))

This unit is located in the vicinity of the town of Manchester just north of the Garcia River and east of the Pacific Ocean. State Highway 1 bisects this unit and Brushy Creek forms the northern and northeastern boundary. This unit for Contra Costa goldfields represents the northern and western limit of the species range (CNDDB 2002) and the only occurrence of Contra Costa goldfields in the Mendocino coast area, and is over 140 km (87 mi) from the closest Contra Costa goldfields unit to the south. Unit 1 is essential for the conservation of the Contra Costa goldfields because it contains mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). The unit is the only location where Contra Costa goldfields has been found on Crispin loam soils. Some of the vernal pool habitats on this site were last surveyed in 1987 and Contra Costa goldfields was not observed at that time (CNDDB 2002); however, the essential habitat requirements for the species still remain and represent an example of the varying habitat types on which the species occurs. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 2, Berryessa Unit, Napa County (1,016 ac (411 ha))

This unit is located south of Lake Berryessa and lies in the Milliken Canyon area east of the City of Yountville and northeast of the City of Napa. This unit was known to be occupied by Contra Costa goldfields at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit is the only location where Contra Costa goldfields has been found on Northern Basalt Flow vernal pools and is ecologically noteworthy for its rock outcrop pools on soils derived from Rhyolite lava flows, within chaparral ecosystems (Holland 1998, USDA 2001, CNDDB 2002). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 3, Napa River Unit, Napa County (534 ac (216 ha))

This unit is located near the Napa River east of the intersection of State Route 121 and 29. This unit was known to be occupied by Contra Costa goldfields at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that

are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit is the only location where Contra Costa goldfields has been found on Hambright rock-outcrop complex soils (USDA 2001, CNDDB 2002). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 4, Fairfield Unit, Solano County (5,929 ac (2,399 ha))

This unit contains three subunits (4A–4C) which occur in the southern portion of Solano County, east of the City of Fairfield, southwest of the City of Vacaville, and north of the Potrero Hills and Nurse Slough. This unit was known to be occupied by Contra Costa goldfields at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit is the only location where Contra Costa goldfields has been found on within vernal pools in alkaline and saline-alkaline sites, as well as those on San Ysidro and Antioch soil series (Holland 1998, USDA 2001, Solano County 1999, CNDDB 2002). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 5, Suisun Marsh Area Unit, Solano County (839 ac (339 ha))

This unit consists of two subunits (5A–5B) in the Suisun Marsh area of southern Solano County. Subunit 5A is the westernmost subunit and is located south and east of the City of Cordelia and the junction of Interstate Highways 80 and 680; this subunit is bisected by the Southern Pacific Railroad line. Subunit 5B is located southwest of the City of Fairfield and west of the City of Suisun City; this subunit is bisected by the Southern Pacific Railroad line. This unit was known to be occupied by Contra Costa goldfields at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit is the only location where Contra Costa goldfields has been found on within vernal pools in the saline-alkaline transition zone between vernal pools and tidal marshes on Rincon soil series (USDA 1994, CNDDB 2002). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool

habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 6, Rodeo Creek Unit, Contra Costa County (398 ac (161 ha))

The unit is near Rodeo Creek and adjacent to State Highway 4, southeast of the City of Rodeo and northeast of the City of Hercules. This unit was known to be occupied by Contra Costa goldfields at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit is the only location where Contra Costa goldfields has been found on within vernal pools on Conejo clay loam soils (USDA 2001, CNDDB 2002). This unit is over 25 km (16 mi) from the closest unit to the north, and almost 50 km (32 mi) from the closest unit to the south. Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 7, Byron Hot Springs Unit, Contra Costa County (3,286 ac (1,330 ha))

This unit is in the vicinity of Byron Hot Springs and Byron Airport and lies directly west of Clifton Court Forebay. This unit includes habitat in low-lying areas east of the Altamont Hills, but also includes habitat within a small portion of Altamont Hills. This unit was known to be occupied by Contra Costa goldfields at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit is the only location where Contra Costa goldfields has been found on within vernal pools on Linne clay loam soils, and has been characterized as alkaline meadow (USDA 2001, CNDDB 2002). This unit is over 35 km (22 mi) from the closest unit to the north, and almost 50 km (32 mi) from the closest unit to the south is the only remaining extant occurrence record of Contra Costa goldfields in southeastern Contra Costa County (CNDDB 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 8, Southeastern San Francisco Bay Unit, Alameda and Santa Clara Counties (92 ac (37 ha))

This unit consists of two areas in southeastern San Francisco Bay and is situated south of the cities of Fremont and Newark and north of Mud Slough. This unit was known to be occupied by Contra Costa goldfields at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the

species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). This unit is the only location where Contra Costa goldfields has been found in saline alkaline transition zones within tidal marsh habitats (CNDDB 2002, Holland 1998). This unit is over 50 km (31 mi) from the nearest units to the north, and almost 100 km (62 mi) from the nearest Contra Costa goldfields unit to the south (CNDDB 2001). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Contra Costa goldfields' distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 9, Fort Ord Unit, Monterey County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Hoover's Spurge

Unit 1, Vina Plains Unit, Butte and Tehama counties (471 ac (191 ha))

This unit occupies an area south of Toomes Creek and north of Pine Creek to near the Cana Highway. State Highway 99 bisects this unit and the western boundary generally parallels the Southern Pacific Railway line that is east of the Sacramento River. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of habitat to urban uses, conversion of grazed lands into intensive agriculture, control of invasive plant species and inappropriate livestock grazing regimes.

Unit 2, Butte Unit, Butte County (770 ac (312 ha))

This unit occurs in area north of the intersection of State Highway 99 and County Route 149 in Butte County. The eastern boundary extends to the watershed of Clear Creek and the western boundary extends toward the south paralleling State Highway 99 to Little Dry Creek. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture, control of invasive plant species and inappropriate livestock grazing regimes.

Unit 3 Sacramento Wildlife Refuge Unit, Colusa and Glenn counties

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 4, Waterford Unit, Stanislaus and Tuolumne counties (5,070 ac (2,052 ha))

This unit occurs east of the City of Waterford. This unit is bordered by the Tuolumne River to the south and the Modesto Reservoir to the southwest. Warnerville Road cuts through the northern portion of this unit. The City of La Grange is located southeast of this unit. The eastern boundary extends into the low elevation of the foothills of the Sierra Nevada. The vernal pools and pool complexes on these alluvial terraces are generally older than others within the range of the species. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods,

and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture, control of invasive plant species and inappropriate livestock grazing regimes.

Unit 5, Turlock Unit, Stanislaus and Merced counties (13,648 ac (5,523 ha))

The Turlock Unit is composed of three subunits (5A, 5B, and 5C) and is generally bordered on the north by the Tuolumne River the Merced River on the south. This unit is found between the towns of La Grange and Snelling. County Road J9 runs west of this unit and the eastern edge is located in the low elevation foothills of the Sierra Nevada. Vernal pools and pool complexes in this unit occur on Meikle soil series. This unit with its two subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture and associated reduced water quality from agricultural tail water, and control of invasive plant species.

Unit 6, Grasslands Unit, Madera, Merced, and Stanislaus counties (12,385 ac (5,013 ha))

This unit is composed of five subunits (6A–6E) and is generally located north of the City of Los Banos and southwest of the City of Merced. Vernal pool complexes and habitat for the species occur on Delhi–Dello–Himar, Solano–Caypay–Willows, Rossi–Waukena, and Lewis–Landlow soil series. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture, control of invasive plant species and inappropriate livestock grazing regimes.

Units 7, Tulare Unit, Tulare County (82,368 ac (33,332 ha))

This unit is composed of five subunits (7A—7E) and is generally located in northern Tulare County. The western most subunit is located east of County Road J19. Tulare County Road 63 cuts through its eastern edge. St. John's River is south of the subunit and the Southern Pacific Railroad runs through its eastern edge. The other subunits are located east of Road 63. The smallest subunit is directly east of the most western subunit. Road 201 passes through both of the easternmost subunits. The subunit that lies next to the easternmost subunit contains vernal pool habitat north of Stokes Mountain. That subunit is bordered on the south by Cottonwood Creek. The easternmost subunit extends into the low elevation foothills of the Sierra Nevada. Colvin Mountain is located within its northeastern boundary. Road 245 bisects this subunit and

the south side of Red Mountain is within its northeast boundary. This unit along with each of its subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture and control of invasive plant species.

Fleshy Owl's-Clover

Unit 1, Southeast Sacramento Valley Unit, Sacramento and San Joaquin counties (2,422 ac (980 ha))

This unit is located about 3 mi (4.8 km) east of Galt around Dustin and Liberty roads. It has been occupied by the subspecies at least since the time of listing, and represents the northernmost extent of fleshy owl's-clover range. The unit is isolated from other occurrences of fleshy owl's-clover by more than 50 mi (80 km). Isolated and peripheral populations such as this may have genetic characteristics essential to the overall long-term conservation of the species (Lesica and Allendorf 1995). The unit contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture and control of invasive plant species.

Unit 2, Waterford Unit, Stanislaus and Tuolumne counties (31,875 ac (12,899 ha))

This unit lies north and east of the Modesto Reservoir in Stanislaus County, extending up to about a mile into Tuolumne County on its northeast side. It has been occupied by the subspecies at least since the time of listing, and is important for its large areas of contiguous habitat with relatively intact hydrology. The unit contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture and control of invasive plant species.

Unit 3, Merced Unit, Merced County (85,197 ac (34,478ha))

This unit consists of two subunits: 3A and 3B. Subunit A is located north of the Merced River, and south of Dry Creek. Subunit B is located south of the Merced River and north of Mariposa Creek. Both subunits are located east of State Highway 99. The Merced unit supports over 50 percent of the known occurrences of fleshy owl's-clover, and both subunits have been occupied at least since the time of listing. This unit represents the largest remaining habitat area for fleshy owl's-clover, and includes the largest block of pristine, high density vernal pool grasslands remaining in California (Holland 1998, Vollmar 1999). The unit contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include urban and agricultural conversion, and inappropriate grazing.

Unit 4, Madera Unit, Madera County (38,039 ac (15,394 ha))

This unit lies east of the city of Madera and west of Millerton Lake and the San Joaquin River. It includes vernal pool complexes on mima mound topography, and has supported Fleshy owl's-clover populations since at least the time of listing. The unit contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include urban and agricultural conversion.

Unit 5, Fresno Unit, Fresno County (14,081 ac (5,698 ac))

This unit consists of two subunits: 5A and 5B lying northeast of the city of Clovis and including vernal pool habitat along Dry Creek, the Friant Kern Canal, and State Highway 168. This area represents the southern extent of the species' range, and has supported Fleshy owl's-clover since at least the time of listing. The unit contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include urban and agricultural conversion.

Unit 6, Table Mountain Unit, Fresno and Madera counties, (1,723 ha (4,258 ac))

Unit 6 for fleshy owl's-clover is comprised of two subunits: 6A and 6B. Both subunits are located east of Millerton Lake on basalt mesas above the San Joaquin River. Subunit 6B is located on Kennedy Table in Madera County, and Subunit 6A is directly south of this unit across the San Joaquin River on Table Mountain in Fresno County. The Table Mountain Rancheria is south of this unit. This is the only area where fleshy owl's-clover is found on this vernal pool type. Northern Basalt Flow pool complexes, such as Table Mountain, are extremely rare, occurring only on ancient terraces and hilltops. The area has been occupied by the subspecies since at least the time of listing. The unit contains the following vernal pool and associated upland features that are essential for the conservation of the subspecies: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include agricultural conversion, inappropriate grazing and control of invasive species.

Colusa Grass

Unit 1, Davis Grassland Area Unit, Yolo County (440 ac (178 ha))

This unit is located southeast of the City of Davis and south of the South Fork of Putah Creek. This unit's western boundary coincides with a portion of the Solano and Yolo county boundary line. This unit was known to be occupied by Colusa grass at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). This unit contains vernal pools on an alkaline phase of the Pescadero soil series. Special management considerations within this unit include: control of invasive plant species, hydrological disruptions or modifications, management of livestock grazing animals, and disturbances from surrounding agricultural practices.

Unit 2, Jepson Prairie Unit, Solano County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 3, Farmington Unit, Stanislaus County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 4, Waterford Unit, Stanislaus and Tuolumne counties (48,838 ac (19,764 ha))

The Waterford Unit is composed of five subunits (4A—4E) and is generally bordered by the Stanislaus River to the north and the Tuolumne River of the south. The eastern unit boundary extends into the low foothills of the Sierra Nevada. The City of La Grange is located southeast of this unit. County Road J9 runs west of this unit and the City of Oakdale is located outside the northwest corner. This unit along with each of the subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Vernal pools and associated upland habitats for the species are found on alluvial terraces and associated Whitney soil series and other acidic soils formed on alluvial fans. Special management considerations within this unit include: conversion of habitat to urban uses, conversion of habitat into dryland and irrigated pasture, control of invasive plant species, hydrological disruptions or modifications from intensive agricultural practices, and disturbances due from surrounding agricultural practices.

Unit 5, Turlock Unit, Stanislaus and Merced counties (35,133 ac (14,218 ha))

This unit is composed of five subunits (5A—5E) and is generally bordered by the Tuolumne River to the north and the Merced River to the south. This unit lies between the towns of La Grange in Stanislaus County to the north and just north of Snelling to the south. The eastern edge is located in the low elevation foothills of the Sierra Nevada. The western edge is bordered by intensively farmed lands of the San Joaquin Valley in northern Merced County. This unit along with each of its subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). The watershed of this unit has been reduced and fragmented by hundreds of acres of orchards that have been planted upslope of this unit. Special management considerations include the conversion of habitat in this unit into orchards or other intensively farmed lands, control of invasive plant species, and associated reduced water quality from agricultural tail waters.

Unit 6, Merced Unit, Merced and Mariposa counties (54,119 ac (21,901 ha))

This unit is composed of two subunits (6A and 6B) and is generally located northeast from the City of Merced, although the eastern portion of this unit extends into Mariposa County in the low elevation of the foothills of the Sierra Nevada. The northern boundary parallels the Merced River and Bear Creek serves as the southern border. This unit is located east of State Highway 99. This unit along with its two subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of upland habitat to urban uses, conversion of upland habitat into irrigated agriculture, control of invasive plant species, hydrological disruptions or modifications from intensive agricultural practices.

Unit 7, Grasslands Ecological Unit, Merced County (13,564 ac (5,489 ha))

This unit is composed of six subunits (7A—7F) and is generally located in an area northeast of the City of Los Banos, southwest from the City of Merced, northwest from the area of El Nido and southeast from the town of Stevinson. This unit along with each of the six subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). The unit is selected to include the only vernal pools found on clay or silty clay loams in the Landlow and Lewis soil series that contain extant occurrences of the species

and represents the only extant occurrences of the species on the San Joaquin Valley floor. Special management considerations within this unit include: conversion of upland habitat to agriculture, control of invasive plant species, hydrological disruptions or modifications from intensive agricultural practices, and inappropriate livestock grazing regimes.

Greene's Tuctoria

Unit 1, Modoc Plateau Unit, Lassen and Shasta counties (1,837 ac (744 ha))

This unit occurs on the volcanic plateau of northeastern California and is located in the area surrounding Murken Lake east of Hat Creek near Cinder Butte. Bidwell Road meanders through the southern boundary. This unit is the only one of its kind on Northern Basalt Flow vernal pools and in a pine forest. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: inappropriate livestock grazing regimes and control of invasive plant species.

Unit 2, Vina Unit, Butte and Tehama counties (10 ac (4 ha))

This unit occupies an area south of Toomes Creek and north of Pine Creek to near the Cana Highway. State Highway 99 bisects this unit and the western boundary generally parallels the Southern Pacific Railway line that is east of the Sacramento River. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of habitat to urban uses, conversion of grazed lands into intensive agriculture, control of invasive plant species, and inappropriate livestock grazing regimes.

Unit 3, Butte Unit, Butte County, (1,279 ac (518 ha))

This unit is generally located in an area north of the intersection of California State Route 99 and Route 149 in Butte County. The eastern boundary extends up the watershed of Clear Creek and the western boundary extends south paralleling State Route 99 to Little Dry Creek. Vernal pool bearing soils that contain habitat for the species are found on Tuscan soil series. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of habitat to urban uses, conversion of grazed lands into intensive agriculture, control of invasive plant species, and inappropriate livestock grazing regimes.

Unit 4, Richvale Unit, Butte County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 5, Sacramento National Wildlife Refuge Unit, Glenn and Colusa counties

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

Unit 6, Waterford Unit, Stanislaus and Tuolumne counties (50,809 ac (20,561 ha))

This unit is composed of five subunits (6A—6E) and occurs east of the City of Waterford. This unit is generally bordered by the Tuolumne River to the south and the Tuolumne River to the south. Warnerville Road cuts through the northern portion of this unit. The City of La Grange is located southeast of this unit. County Road 9J runs west of this unit. The eastern boundary extends into the low elevation of the foothills of the Sierra Nevada. The vernal pools and pool complexes on these alluvial terraces are generally older than others within the range of the species. This unit along with each of the four subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture, control of invasive plant species and inappropriate livestock grazing regimes.

Unit 7, Merced Unit, Madera, Mariposa, and Merced counties (86,636 ac (35,060 ha))

This unit is mostly located in Merced County with its eastern edge overlapping into Madera County. The northern boundary parallels the Merced River and, in the south, it extends to the Chowchilla River in Madera County. The entire unit is located east of State Highway 99. This unit was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture, conversion of habitat into urban uses, control of invasive plant species, and inappropriate livestock grazing regimes.

Unit 8, Madera Unit, Madera County (4,548 ac (1,840 ha))

This unit is composed of three subunits (8A—8C) and is generally located in an area of Madera County, extending from an area from the Chowchilla River in the north to the Fresno River in the south. Vernal pools, vernal pool complexes and depressional seasonal wetlands in

this unit are located east of California State Highway 99 and extend into the low elevations of the foothills of the Sierra Nevada. The town of Madera borders the unit on its southwest edge, Hensley Lake is east of this unit, and Eastman Lake is northeast of the unit. This unit along with its subunits was known to be occupied at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: conversion of grazed lands into intensive agriculture, conversion of habitat into urban uses, control of invasive plant species, and inappropriate livestock grazing regimes.

Hairy Orcutt grass

Unit 1, Vina Plains Unit, Tehama County (2,087 ac (845 ha))

This unit is located north east of the City of Corning, approximately south of Acorn Hollow Creek, north of Singer Creek, and west of Shingle Steel Tower Transmission utility line. This unit represents the northern extent of the species range, and is over 40 km (25 mi) from the nearest occurrence to the south. Species occurrences in the unit grow in large vernal pools on Tuscan and Anita soils (USDA 2001). This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate hairy Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 2, Butte Unit, Butte County, California (8 ac (3 ha))

This unit is located adjacent to State Highway 99, north of the intersection of State Route 99 and Route 149. This unit represents some of the last remaining lower elevation vernal pool habitats in Tehama and Butte counties. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate hairy Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 4, Turlock Units, Stanislaus, Merced, and Mariposa counties (48,640 ac (19,684 ha)

This unit consists of three subunits (4A–C). These units are bordered by the Tuolumne River to the north, the Merced River to the south, and lie between the towns of La Grange and Snelling. County Road J9 runs west of the units and the eastern edge is located in the low elevation foothills of the Sierra Nevada. The Hickman pool complex contains one of the largest vernal lakes in California at more than 121 ha (300 ac) and represents a unique habitat for hairy Orcutt grass. This unit contains large, intact vernal pool grasslands that help maintain the distribution of the species over its entire range. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive

agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate hairy Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 5, Madera Unit, Madera County (1,839 ac (744 ha))

This unit consists of two subunits (5A–5B). This unit contains vernal pool habitat extending from the Madera Canal and reservoir in the north to the Fresno River in the south. The Fresno River separates this unit from the Cottonwood Creek Unit to the south. All vernal pools in this unit are located east of the Atchison, Topeka, and Santa Fe Railroad and extend into the low elevation foothill region of the Sierra Nevada. The town of Madera is located southwest of the unit, Hensley Lake is east, and Eastman Lake is northeast of the unit. To maintain the full range of ecological conditions in which this species occurs, conservation of hairy Orcutt grass populations and vernal pool habitat in the Madera Unit is important. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate hairy Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 6, Cottonwood Creek Unit, Madera County (27,033 ac (10,940 ha))

This unit contains vernal pool habitat extending from the Fresno River in the north to the San Joaquin River in the south. The Fresno River separates this unit from the Madera Unit to the north. All vernal pools in this unit are located east of the Atchison, Topeka, and Santa Fe Railroad, extending east into the low elevation foothill region of the Sierra Nevada. This unit represents the southern extent of hairy Orcutt grass range. This unit contains large intact and contiguous vernal pool grassland areas that help maintain the distribution of the species through out its range. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate hairy Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Sacramento Orcutt Grass

Unit 1, Phoenix Field and Phoenix Park Unit, Sacramento County (26 ac (11 ha))

This unit is located within the City of Fair Oaks, and lies east of Hazel Avenue and northwest of Lake Natoma. This unit is bounded by urban development except for the east side, which is adjacent to Folsom Lake State Recreation Area. The City of Fair Oak's Phoenix Park, Phoenix Field, and Jim David Park are included within the boundaries of this unit. This unit represents the northern extent of the species range, and one of only three areas where Sacramento Orcutt grass is known to occur. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Sacramento Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 2, Southeast Sacramento Valley Unit, Sacramento County (1161 ac (470 ha))

This unit is located south of Mather Airport and Regional Park. The unit is approximately bound on the east by Eagles Nest Road, the west by Excelsior Road, and the south by Jackson Highway/Highway 16. This unit also represents one of only three units for the species across its entire range. This unit includes relatively undisturbed, hydrologically intact vernal pool habitats as mapped by Holland (1998), that may continue to support natural vernal pool ecosystem processes and maintain the necessary habitat conditions for Sacramento Orcutt grass to complete germination and reproduction. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Sacramento Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 3, Rancho Seco Unit, Sacramento and Amador Counties (32,086 ac (12,985 ha))

This unit occupies the area south of Laguna Creek and north of the Sacramento and San Joaquin county line along Dry Creek. The eastern boundary is the low elevation foothills of western Amador County. The western limit is bounded by urban and agricultural areas near the cities of Galt and Elk Grove and along the foothill region of the southeastern Sacramento Valley. This unit represents one of only three areas where this species is known to occur, and is the southern extent of the species range. All of these areas improve the species chances of surviving natural and environmental changes, as well as random or stochastic events. This unit includes

relatively undisturbed, hydrologically intact vernal pool habitats, that support natural vernal pool ecosystem processes and maintain the necessary habitat conditions for the species. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate Sacramento Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

San Joaquin Valley Orcutt grass

Unit 1, Merced Unit, Merced and Mariposa Counties (54,124 ac (21,903 ha))

A majority of the vernal pool habitat in the Merced Unit is in Merced County, although the eastern edge of the unit overlaps into Mariposa County in the low elevation foothills of the Sierra Nevada. The northern boundary parallels the Merced River, and Bear Creek serves as the southern border. The entire unit is located east of State Highway 99. This unit contains the only area where San Joaquin Valley Orcutt grass is found on vernal pools formed upon Corning and Greenfield soils, and one of only two sites where it is found on San Joaquin soils (Holland 1998, USDA 2001, EIP 1999). This unit supports some of the largest, most robust occurrences of the species (Holland 2000). The area within this unit encompasses the largest block of pristine, high density vernal pool grasslands remaining in California (Vollmar 1999). This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate San Joaquin Valley Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 2, Le Grand Unit, Merced, Mariposa, and Madera Counties (32,008 ac (12,953 ha))

The eastern edge of the unit overlaps into Mariposa County and in the south it extends to the Madera County line. Mariposa Creek serves as the northern boundary. The entire unit is located east of State Highway 99. The towns of Le Grand and Planada are adjacent to the western edge of the unit. The Le Grand Unit contains large intact and contiguous vernal pool grassland areas that provide connectivity between units to the north and south. This unit is important to maintain the range of habitats in which the species is known to occur. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate San Joaquin Valley Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 3, Madera Unit, Madera County (30,714 ac (12,430 ha))

This unit is consists of three subunits (3A–3C). Madera Canal is approximately the northern boundary of the unit. Habitat within this unit is located east of the Atchison, Topeka, and Santa Fe Railroad and extends into the low elevation foothill region of the Sierra Nevada.

The town of Madera borders the unit on its southwest edge, Hensley Lake is east of the unit, and Eastman Lake is northeast of the unit. This area is the only location where the species is found on Cometa and San Joaquin soils (USDA 2001). This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate San Joaquin Valley Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 4, Fresno Unit, Fresno County (476 ac (193 ha))

This unit is located south of Little Dry Creek and approximately between the Friant-Kern Canal and foot of Owens Mountain. Copper Avenue is to the south. This unit is significant geographically, as it may contribute to dispersal to vernal pool habitats north and south of it. The diversity of vernal pool types found within the Fresno Unit contributes to the range of ecological conditions in which San Joaquin Valley Orcutt grass occurs. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate San Joaquin Valley Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 5, Table Mountain Unit, Fresno and Madera Counties, (4,258 ac (1,723 ha))

This unit is consists of two subunits (5A–B). Both subunits are located east of Millerton Lake on basalt mesas above the San Joaquin River. Subunit 5B is located on Kennedy Table in Madera County, and Subunit 5A is directly south of this unit across the San Joaquin River on Table Mountain in Fresno County. This area supports occurrences of the species within Northern Basalt Flow vernal pools (Holland 1998, Keeler-Wolf et al. 1998, CNDDB 2002). This is the only area where San Joaquin Valley Orcutt grass is known to occur within these pool types (CNDDB 2001). Northern Basalt Flow vernal pool complexes are an extremely rare vernal pool habitat occurring only on ancient terraces and hilltops above the surrounding low-lying terrain. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate San

Joaquin Valley Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 6, Tulare Unit, Tulare County (14,733 ac (5,962 ha))

This unit is consists of four subunits (6A–6D). Subunits A and B are located east of J19, approximately west of Road 63, St. Johns River is south and the Southern Pacific Railroad runs northeast. Subunits C and D are located east of Friant-Kern Canal, west into the low elevation foothills of the Sierra Nevada. Colvin Mountain is within the southwest boundary of subunit 6D and Red Mountain is within the northeast boundary of 6C. This unit contains occurrences of the species within vernal pools on Madera and Greenfield soils that provide the primary constituent elements essential to the conservation of the species (USDA 2001, CNDDB 2001). This unit represents the southern extent of San Joaquin Valley Orcutt grass range. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate San Joaquin Valley Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Slender Orcutt grass

Unit 1, Modoc Plateau Unit, Plumas, Lassen, Shasta, Modoc, and Siskiyou counties (27,179 ac (11,001 ha))

This unit for slender Orcutt grass consists of eleven subunits. This unit is largely within the volcanic plateau of northeastern California. The subunits are identified as the Lake Almanor, Crater Lake Mountain, Poison Lake, Badger Mountain, Lost Creek, Goose Valley, Long Valley, Cayton Creek, and Timbered Crater subunits. The Lake Almanor subunit (1K) is located in Plumas County, on the southwestern part of Lake Almanor along Humbug Humboldt Cross Road and State Route 89. The area extends from near the shoreline upslope to the watershed boundary. The Crater Lake Mountain subunit (1I) is located along Route 44 and encompasses the northwestern portion of Crater Lake Mountain as well as Grays and Harvey valleys. The Poison Lake subunits (1G and 1H) are located north of State Route 44 near Pittville Road. The western boundary is near Halls Flat Road. The Badger Mountain subunit (1J) is located north of Badger Mountain and east of State Route 89 and 44, and South of Potato Butte. The Lost Creek subunit (1F) is located south of Cinder Butte and west of the Hat Creek Rim. The Goose Valley subunit (1E) is located in Shasta County northwest of the intersection of State Route 299 and Route 89 in Goose Valley north of Burney. The Long Valley subunit (1D) is located in Long Valley west of Black Ranch Road south of Long Valley Mountain and east of Lookout Mountain. The Cayton Creek subunit (1C) is located in Shasta County north of Cayton Valley and Lake Britton east of Route 89. The area includes the northwestern portion of the watershed boundary for Fort Mountain along Red Mountain Road. The subunit is located in the Shasta National Forest. The Timbered Crater subunits (1A and 1B) are located on the Shasta/Modoc/Siskiyou county border near Little Hot Springs Valley. The subunit includes the area adjacent to Timbered Crater up to the Whitehorse Mountains and Day Road. These occurrences are all found on the Modoc Plateau, where they are located at higher elevations, and experience the coldest climatic conditions of any other areas throughout the species range. The occurrences are on Northern Basalt Flow vernal pools (CNDDB 2002). This area represents the northern-most extent of the range of slender Orcutt grass, and is over 50 km (32 mi) from the nearest occupied areas to the south. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate slender Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 2, Stillwater Plains Unit, Shasta County (10,780 ac (4,363 ha))

This unit contains four subunits (2A–2D). These are located in the area east and south of the city of Redding near the Redding Municipal Airport encompassing Stillwater Plains to the confluence of the Sacramento River and Cow Creek. This unit contains many occurrences of slender Orcutt grass (CNDDB 2001) living within large vernal pool grassland areas that support

aggregations or systems of hydrologically interconnected pools, swales, and other ephemeral wetlands and depressions within a matrix of surrounding uplands that together form hydrologically and ecologically functional units (EPA 1994, Holland 1998, Shasta County 2001). This unit represents the northern extent of the species range in the Sacramento Valley. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate slender Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 3, Inskip Hill, Tehama and Shasta counties (48,114 ac (19,471 ha))

The unit contains two subunits (3A–3B). These units are located south of the Tehama/Shasta county line south to Seven-mile Creek near the Tuscan Buttes. The eastern boundary encompasses the vernal pool habitats along the lower elevation bordering the Sacramento River. The western boundary roughly follows the Sacramento River. The area supports over 40 percent of the known occurrences the species (CNDDB 2002) and is important in maintaining a diversity of habitats for slender Orcutt grass. This unit contains large vernal pool complexes that represent some of the last remaining lower elevation vernal pool habitats in the northern Sacramento Valley. These habitats are important to maintain the geographical distribution of slender Orcutt grass in the area. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate slender Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 4, Vina Plains Unit, Tehama County (2,838 ac (1,149 ha))

This unit is located north east of the City of Corning, approximately south of Acorn Hollow Creek, north of Singer Creek, and west of Shingle Steel Tower Transmission utility line. This unit supports occurrences of the species within vernal pools on Tuscan loam and Inks soils (CNDDB 2002) and the vernal pool habitats provide the necessary timing and length of inundation for slender Orcutt grass germination, growth, and reproduction. This area is over 160 km (100 mi) from the nearest area occupied by slender Orcutt grass to the south. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for

germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate slender Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 5, Bogg's Lake Unit, Lake County (4,141 ac (1,676 ha))

This unit consists of two subunits (5A–5B). Both subunits are located south of Clear Lake. Subunit 5A is located west of State Highway 175. Subunit 5B is located east of State Highway 29, and includes Little High Valley. This unit supports occurrences of the species within Northern Volcanic Ashflow vernal pools (Keeler-Wolf et al. 1998, CNDDB 2002). This area represents the western extent of the slender Orcutt grass's range, and some of the last remaining vernal pool habitats in Lake County. Isolated and peripheral populations such as this may have genetic characteristics essential to the overall long-term conservation of the species (i.e., they may be different from other populations in other parts of its range) (Lesica and Allendorf 1995). This is the only unit which contains examples of Northern Volcanic Ash Flow vernal pools and has occurrences of slender Orcutt grass. This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate slender Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Unit 6, Southeast Sacramento Valley Unit, Rancho Cordova, Sacramento County (1,161 ac (470 ha))

This unit is located south of Mather Airport and Regional Park. The unit is approximately bound on the east by Eagles Nest Road, the west by Excelsior Road, and the south by Jackson Highway/Highway 16. This unit supports occurrences of the species within vernal pools on Redding soils and is the southern extent of the species range (CNDDB 2001, Holland 1998). Isolated and peripheral populations such as this may have genetic characteristics essential to the overall long-term conservation of the species (i.e., they may be different from more central populations) (Lesica and Allendorf 1995). This unit contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat which provide for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for germination, flowering, and seed production (PCE 2). Special management considerations within this unit include: habitat conversion to urban uses or intensive agriculture, hydrologic disruptions or modifications which may disturb vernal pool habitats and restrict or isolate slender Orcutt grass distribution, management of grazing animals, management of off-road recreational vehicles, and control of invasive species.

Solano Grass

Unit 1, Davis Grassland Area Unit, Yolo County (440 ac (178 ha))

This unit is located southeast of the City of Davis and south of the South Fork of Putah Creek. This unit's western boundary coincides with a portion of the Solano and Yolo county boundary line. This unit was known to be occupied by Solano grass at the time of listing, is currently occupied, and contains the following vernal pool and associated upland featured that are essential for the conservation of this species: mound and inter-mound topography (PCE 1) within a matrix of surrounding upland habitat that provides for seed dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat, which provides for germination, flowering, and seed production (PCE 2). This unit contains vernal pools on an alkaline phase of the Pescadero soil series. Special management considerations within this unit include: control of invasive plant species, hydrological disruptions or modifications, management of livestock grazing animals, and disturbances from surrounding agricultural practices.

Unit 2, Jepson Prairie Unit, Solano County

This unit has been excluded from the final designation. See Exclusions Under Section 4(b)(2) of the Act, in the August 11, 2005, Federal Register (70 FR 46924).

For further information regarding the designation of critical habitat for the 15 vernal pool species identified above, please contact the Sacramento Fish and Wildlife Office at 916-414-6600.